ENVIRONMENT

Development

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Chris Power

A photo of the site model for the expanded Boulder Public Library. The new building (upper left) is designed to adapt to the contours of the Boulder Creek floodplain.

"Nature Bats Last": The Politics of Floodplain Management

By Jim Schwab

Experience, it is said, is a great teacher. The magnitude of this greatness often stems from the intensity of the experience in question. More than any other disaster in recent U.S. history, for example, the Mississippi Valley floods of 1993 brought home to dozens of communities the importance of implementing effective land-use regulations in floodplains. Yet many of these communities had experienced repetitive flooding in the past. For better or worse, political systems tend to respond to crisis. This issue of *Environment & Development* focuses on the forces that drive development in floodplains, how communities can learn more quickly to deal with the problem, and the distinguishing features and program components of communities with effective floodplain land-use regulations.

How Did We Get Here?

The idea that floodplains require special efforts in land-use management presupposes that there are important inducements for people and businesses to locate there. People have tended to locate commercial and residential activities in flood-prone areas almost since the dawn of civilization because these locations offer some significant advantages. Perhaps equally important is the tendency, often enhanced by modern flood-control technology, to ignore the significant disadvantages.

For commercial and industrial land uses, there have been many historic advantages. Most of the world's great cities have been built to some degree around water-based transportation. Many of these uses properly belong near the waterfront and thrive there, and many can also afford insurance and engineering measures to protect their inventories or production equipment. Zoning ordinances generally recognize these facts and accommodate them as a means of promoting commerce and creating jobs.

Residential uses in the floodplain, however, pose a different problem, for their presence is usually not essential. Residential development tends to be attracted by the natural amenities that waterfront sites offer, including trees, views, and proximity to water-dependent recreation. In addition, lower-income residential uses, including manufactured housing, are sometimes forced into such locations through a lack of available land elsewhere in the community, as a result of either zoning or market forces, or both.

While the potential for disaster is theoretically a deterrent to these locational decisions, in reality it is tempered or neutralized by two factors: inaccurate or nonexistent perceptions of the problem, and inducements to locate in a floodplain. One of the most commonly cited categories of governmental activities in this regard is the construction of dams, levees, and other flood-control measures. Another entails federally subsidized flood insurance and the widespread availability of disaster relief. Critics of these projects and programs have long maintained that floodplain residents are able to deflect too many of the costs of their decisions to the general public.

The National Flood Insurance Program (NFIP) imposes a number of requirements on communities to offset those incentives. But its most potent tool—the Community Rating System,

which offers cooperating communities a chance to lower residents' insurance rates by adopting land-use controls to reduce risk—is relatively recent. Moreover, the best local programs exceed the NFIP's requirements, mostly through strict land-use regulations.

Motives for Floodplain Management

In a study supported by the National Science Foundation (NSF), a team of researchers including Raymond J. Burby, now a professor of urban and regional planning at the University of New Orleans, examined the process by which communities choose to adopt floodplain management regulations and evaluated the strength of those plans in 10 cities. In *Cities Under Water* (Boulder: Institute of Behavioral Science, University of Colorado, 1988), they reported their finding that rapid growth was a considerably more significant motivating factor than past flooding for communities that developed such plans. Cities with slow growth rates had little reason to fear massive development of their floodplains and more reason to fear that adopting strict regulations might discourage development. Where rapid growth was occurring, however, rising land values tended to facilitate floodplain development as the supply of developable land elsewhere in the city dwindled. The researchers also found that the pace of development in flood-prone areas was affected by the size of the land inventory outside the floodplain. Further, the strongest floodplain land-use regulations tended to be recently adopted in communities with a high growth rate and a diminishing supply of developable land outside the floodplain.

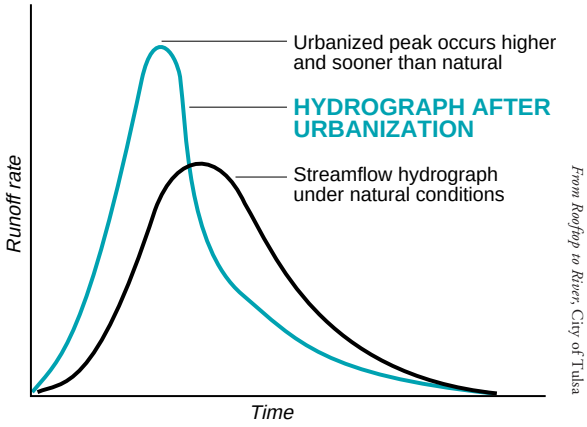
At the same time, many of these communities are also stirred by the pace of growth to express some concern about the preservation of natural resources, including open space, wetlands, and various visual amenities like the urban forest and streamside vegetation. Burby and his colleagues found that a strong community environmental ethic tended to undergird the adoption of stringent floodplain land-use regulations.

While the NSF study identified and delineated the impacts of a number of other variables in both floodplain development and land-use planning, the findings are valuable to planners who need to understand the means of building constituent support for effective floodplain regulations. Many communities' efforts in this regard have been nearly stillborn because the community lacked a widely shared perception of the need for such regulations.

Dramatic Lessons

One city that has experienced both recent rapid growth and the harsh realities of a major disaster is Tulsa, Oklahoma. The NSF study used a ranking system to rate its 10 case-study communities on the overall strength of their floodplain land-use management programs, using indicators for location, construction, implementation, and enforcement as four key dimensions of the program. From a potential score of 120 for an ideal program, Tulsa scored 42, ranking seventh of the 10 cities surveyed.

At the time, however, Tulsa's political will to develop an effective program was already gaining momentum. Tulsa had issued 873 new residential building permits in floodplains between 1976 and 1985. Earlier decades of rapid growth already had driven development ever more deeply and densely into the city's floodplains, which occupy between 10 and 15 percent of its 200 square miles (see map). One-third of the city is drained by the Mingo Creek watershed, much of whose urbanization occurred prior to the area's annexation in 1966. Then the inevitable occurred, given the volatile weather patterns that have given eastern Oklahoma the label "Tornado Alley." Severe thunderstorms on Memorial Day in 1984 triggered massive flooding throughout the city, killing 14, injuring 288, damaging or destroying nearly 7,000 buildings, and producing $180 million in damages.



The growth of impervious suface that accompanies urbanization greatly increases peak runoff during storms.

At the time of the NSF study, Tulsa was already constructing a floodplain management program out of the resulting wellspring of public support for meaningful action to avert future problems. Today, its program would unquestionably earn a higher ranking, in large part because of a series of organizational changes in local government that facilitated stronger land-use management of the city's floodplains. In the 1990s, its program has earned awards and the nation's lowest flood insurance rates from the Federal Emergency Management Agency (FEMA).

What exactly is Tulsa doing? For one thing, it has established an aggressive program for acquisition and relocation of floodplain structures, using a set of criteria to establish priorities for such expenditures (see box). To date, the city has acquired almost 1,000 properties in the floodplain, but decades of earlier development still leave it with an inventory of vulnerable structures numbering in the thousands. To stretch its acquisition budget, says Ann Patton,

Choosing Floodplain Properties for Acquisition–Tulsa's Priorities

1. Is the building in a city plan (master drainage, urban redevelopment, park, open space, other)?
2. Is it identified for acquisition, either nonstructural acquisition (first priority) or right-of-way for a structural project?
3. How is it used? First priority goes to places where people sleep, then to critical facilities, and others.
4. Is it in a floodway, repetitive loss area, and/or regulatory floodplain?
5. Does the owner have flood insurance (high priority, along with mitigation insurance, when available)?
6. Is the building in a contiguous project area, suitable for community reuse and/or open space? Would the project meet other public objectives? Does it merit special consideration because of poor access during flooding, isolation, or hardship? Other pertinent factors?

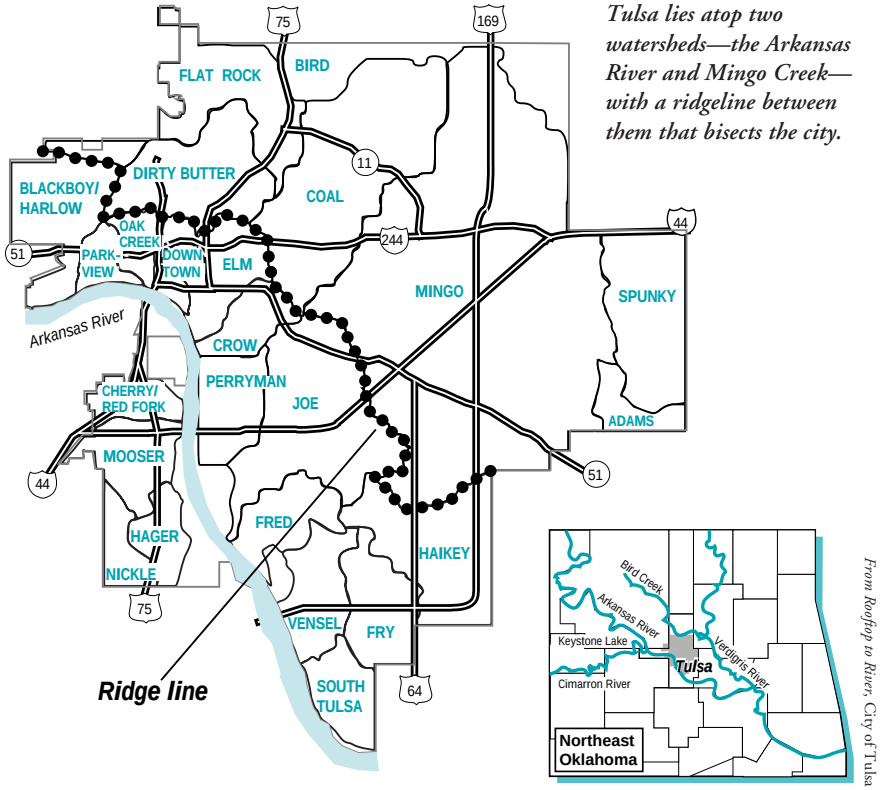
From "Pre-Flood Mitigation Planning—Tulsa Keeps at It," Ann Patton, *News & Views* (Association of State Floodplain Managers), December 1993.

community affairs manager for the public works department, the city tries to combine acquisition with other objectives, such as development of bicycle trails or public parks, thus achieving two or more purposes simultaneously with each buyout. Tulsa is not alone in this endeavor. Multi-objective management is gaining popularity across the nation as a fiscally frugal means of solving longstanding floodplain land-use problems.

Patton says the 1984 floods also generated the citizen demands for action that led to the passage the following year of a stormwater utility fee. The fund, administered since 1990 by the public works department, underwrites the floodplain management system, including stormwater maintenance, permit processing, and master drainage planning. The fee, which generates about $10 million yearly, is currently $2.70 monthly per residence or equivalent service unit (2,650 square feet of impervious surface area). Although Tulsa does not use its limited stormwater funds for capital projects, Charles Hardt, the city's chief operations officer and public works director, notes that many others that have copied the system do so, usually when their capital improvements needs are much smaller than those of Tulsa.

Both the city's acquisition efforts and the stormwater utility fee are part of a unified program built on a base of three ordinances that followed earlier, less severe floods in the 1970s. Those 1977 ordinances, passed amid a floodplain development moratorium, were designed to facilitate the city's participation in the NFIP. At that time, according to Hardt, the city concluded that its reliance on floodplain zoning alone was misplaced. Tulsa shifted to a floodplain management program based primarily on a permitting ordinance in order to make its regulations more site-specific. The city uses five types of development permits, based on performance standards: floodway, floodplain, stormwater drainage, stormwater connection, and earth change. Hardt says that, prior to the permitting ordinance, developers routinely encroached on the floodplain with each new project. Since then, he says, such practices have come to a halt, and no building complying with that ordinance, which he calls the "heart and soul" of Tulsa's floodplain regulations, has experienced flooding.

Tulsa pioneered in another respect by extending its regulatory reach beyond the NFIP's 100-year floodplain maps. Hardt says Tulsa officials decided in the mid-1980s that mapping is an ongoing process that must respond to changing conditions. The city chose to use maps based on the assumption of a fully urbanized watershed, which would cause water levels to rise beyond those in the NFIP maps, which must be based on the existing level of development. Although the city's legal counsel originally worried that going beyond the NFIP maps would invite legal trouble, Hardt notes that the stricter city regulations are so well accepted that they have never been tested in court. Instead, Tulsa has been able over the years to fine-tune and enhance its program so that it has become an integral element of the city's overall planning process.



Tulsa lies atop two watersheds—the Arkansas River and Mingo Creek—with a ridgeline between them that bisects the city.

From Rooftop to River, City of Tulsa

Choosing Your Weapons

Patton and Hardt stress one important lesson from the Tulsa experience as it applies to other communities: *Don't just copy us*. Do your own homework, and build your own home-grown constituency for addressing floodplain problems. Certainly, they note, there are elements of any successful program that can be borrowed, but what works best for each community will depend on local circumstance, the magnitude and nature of the problem, and other factors. What is important is that planners take stock of the arsenal of tools available for floodplain planning and then choose their weapons carefully. What follows is a brief overview of the potential components of an effective floodplain management program, including a discussion of the role of public education and information.

Land-use regulations. One of the peculiarities of the Tulsa experience is that land-use planning is handled at a regional level, through the Indian Nations Council of Governments, while the local floodplain management program is under the aegis of the city's public works department, which handles both permitting and stormwater maintenance. There is no planning department, as such, at the municipal level. This fact alone would force most other cities to consider a different allocation of responsibilities for regulating floodplain land uses.

Consequently, zoning-related measures and subdivision controls may take on greater importance relative to the overall program. One of the strictest approaches

identified in the NSF study was that of Palatine, Illinois, whose ordinance regulating development within the Salt Creek floodplain includes all land less than one foot above the base flood elevation in the 100-year floodplain plus land subjected to flood damage from ponding. All new development in this zone requires a special use permit from the village board of trustees. However, developers could transfer development to flood-free sites at higher densities than otherwise allowed by the zoning ordinance.

Subdivision regulations and zoning can also redirect development away from flood-hazard areas by emphasizing clustering as a means of preserving floodway open space. Subdivision regulations can specifically affect the distribution, size, and shape of lots so as to keep structures out of the floodplain. They can also require flood management measures, the elevation of roads and utilities, and the preservation of open space near the waterway, and forbid encroachment into the floodplain and waterways by new structures.

Infrastructure. One common feature of growing communities is that they require extensive new infrastructure. Municipal policies concerning the extension of infrastructure into vulnerable areas can go a long way in influencing the pattern of future development by discouraging premature or unwise urbanization of flood-prone areas. While this seems inherently obvious, it is also true that, in the absence of a strong constituency for effective floodplain management, elected officials are often tempted to respond to development pressures by ignoring such advice.

The location and design of public facilities is another significant influence on development in the floodplain. One classic example of making the best of a difficult situation is the expansion of the main public library in Boulder, Colorado (see photo on front page). City officials had planned to relocate this facility to an upland location in a commercial area, but many citizens preferred its scenic downtown location adjacent to Boulder Creek, which is notorious for flash floods. In a referendum, voters chose to keep the old location, although that decision entailed additional expense to comply with floodplain regulations. Designers, however, responded to the challenge by floodproofing the building and shaping its exterior to follow the contours of the mapped floodplain with a modest elevation. The result is at least a small civic lesson in adaptive design of a highly visible public building.

The NSF study notes that transportation access can be another important influence on the desirability of locating in a floodplain. The authors found that the primary attraction was proximity to a major thoroughfare, and they suggested as a result that allowing only minor streets to penetrate flood-prone areas could serve as a deterrent by limiting access.

Mitigation. Though whole volumes have been written on the subject of mitigation, the fundamental rule is astonishingly simple: Identify priorities. Most communities have limited funds for preflood acquisition and relocation, and even federal aid following a disaster is constrained. Know where the money is, set guidelines (see box on page 2), and develop lists of potential acquisitions for quick action following a flood. And stay with it. Mitigation is a strategy for the long term.

Public information. Ann Patton, a former activist turned city official, likes to note that public education is at least as important in developing support for the adoption of a program as it is in winning compliance afterwards. She jokingly describes herself as a "former rabble rouser," but she has a point. The strength and longevity of adopted regulations will depend heavily on the political will of the community at large. At all stages in the development of a floodplain management program, it is important for planners to know how to communicate effectively with citizens and to do it.

A good systematic treatment of public information needs concerning flood hazards appears in the *Post-Flood Recovery Assistance Plan* for Arvada, Colorado, produced in May 1994. These techniques range from the use of technical assistance tables at disaster assistance centers in the aftermath of a flood to the regular publication of community newsletters and handbooks, to press briefings and public meetings. The emphasis on post-disaster assistance highlights the fact that this period can be a significant opportunity for public education and for building support for alternatives to repetitive patterns of damage and rebuilding. People suffering from a disaster often have a new receptivity to ideas about mitigation and/or relocation. Providing individual technical assistance with such issues or staging open houses on reconstruction and mitigation can be effective strategies for influencing public attitudes toward floodplain management. These exchanges allow people to link recent experience with new perceptions of risk, which, as the NSF study noted, can be a much more powerful motivator of public action than theoretical discussions of hypothetical data. The most essential public information lesson concerning planning for post-flood recovery is to mobilize public support while the experience is still fresh.

Tulsa, one of the best examples of such civic mobilization, best expresses its new civic attitude through one of the five principles underlying its watershed management policy framework: "Changes in the natural balance require compensations. Nature bats last."

Ann Patton's Five C's of Floodplain Management

In an interview for this article, Tulsa's Ann Patton, who has served as citizen activist, newspaper reporter, and now city official, suggested that planners remember "Five Cs" to understand the dynamics of creating an effective floodplain management program:

- *Crisis.* It is hard for a community to ignore the problem when it's in a crisis. Seize the opportunity.
- *Coalition.* Bring together citizens, experts, professional staff, and news media, and continue to broaden with everything from developers to bicycle trail enthusiasts. Look for people with primary interests other than floodplain management.
- *Commitment.* "I can hardly overemphasize this," she says. "These issues take years, and in my experience, at least a generation."
- *Comprehensive.* Don't look at problems in a piecemeal manner. Everything is connected, and the entire watershed must be treated as a complete natural system.
- *Combinations.* Marry structural and nonstructural solutions, finding the optimal balance for each specific problem.

Reviving the Platte

Denver Mayor Wellington Webb has made a return to health for the long-degraded South Platte River one of the key priorities of his administration, and the city's fiscal 1996 budget directs $4 million toward that goal to prove it. The local money is matched with other sources that include a $350,000 grant from Great Outdoors Colorado, which distributes state lottery money. That grant will be used specifically for parkland acquisition. The city has also attracted volunteer support for the project, including both AmeriCorps personnel and local youth.

In February 1995, Webb endorsed the recommendations of the South Platte River Corridor Working Group to launch the initiative, which faces some serious obstacles such as negotiating for additional flow with existing water-rights holders. In late September, the South Platte River Commission published a draft report on stream-flow management goals that outlined five scenarios for fishery development along the river through Denver.

The Platte, like many rivers near the mountains, tends to flow swiftly in the spring with mountain snow melt before drying to a trickle in the hot summer. Water users in the region have drawn down natural water levels, and the project aims to restore some of that flow. The plan includes 11 riverbank development projects, some near downtown, as well as new parkland. The eventual price tag is projected to reach $25 million.

For more information: *Andrew Wallach, Denver Mayor's Office, 303-640-4156* ◆

Drilling in the Tip

By Megan Lewis

Residents in Michigan's northern Lower Peninsula are experiencing a 1990s version of the Texas oil rush, with natural gas substituting for black gold. The November 1995 issue of *Michigan Monthly* reported that, since 1989, more than 4,500 natural gas wells have been drilled in six rural Michigan counties. The source is a 360-million-year-old rock called the Antrim Shale, which last year alone produced more than 115 billion cubic feet of natural gas. The flurry of drilling activity can be attributed to the combination of federal and state policies regarding natural gas extraction. Together these two policies have created financial incentives that make drilling highly attractive in an area once ignored as a low-yield reserve.

In 1980, Congress and the Carter administration approved a federal tax credit for developers that allowed them to subtract one dollar from their taxes for every 1,000 cubic feet of natural gas produced. Created after the 1970s energy crisis, this mechanism was designed to reduce dependence on foreign energy sources. To qualify, developers needed to start a new gas well by January 1, 1993.

While this policy encouraged drilling on a national scale, actions taken by Gov. John Engler's administration increased activity in Michigan. A subsidy agreement, negotiated in November 1993 between the governor's aides at the Michigan Department of Natural Resources (DNR) and the Michigan Oil and Gas Association, allows companies to write off nearly all operating expenses for drilling activities on public land before paying any royalties due to the state. In the *Michigan Monthly* article, Joe Quandt, a former DNR enforcement specialist, says the agreement, made without public or legislative comment, was not the only option available to the state. "They've got millions of acres to lease, and they could have cut any deal they wanted. But they just gave it away," he told reporter Keith Schneider.

At stake are not just public lands but private lands as well. State-owned mineral rights below private lands are being sold to energy developers. Michigan law gives the mineral right owner primacy, leaving surface property owners without any power to restrict drilling on their lands.

While the state contends that the oil and gas industry is being an "environmentally responsible partner" in its development activities, area residents have experienced dramatic changes in their environment. The high density of wells, the network of dirt roads, and the miles of pipeline required to transport the gas to the compressing stations have resulted in the fragmentation of thousands of acres of forest. It is estimated that more than 4,500 wells have been drilled in a 50-mile-wide area from Lake Huron to Lake Michigan. A 1993 report from the DNR stated that the rush to establish wells has resulted in extensive erosion into stream corridors, killing thousands of fish and adversely affecting habitat for threatened and endangered plant and animal species. The compressing stations generate a rumble in the forest that can be heard more than a mile away.

To add further salt to the wound, this variety of adverse environmental impacts has not resulted in any financial rewards. On the national level, it is estimated that federal taxpayers are subsidizing oil and gas companies to the tune of $1 billion a year for drilling in rural areas. In Michigan, a DNR supervisor estimates that lost royalty payments cost residents $4 to $6 million annually.

Change may be in the offing, however. The Northeast Michigan Council of Governments and the Tip of the Mitt Watershed Council produced a study that confirmed the DNR findings regarding the impact to habitat and forest land. It called for a change in the permitted minimum distance between wells. While these two groups advocated increasing the spacing from 40 acres to 160, hearings held by the DNR resulted in a spacing requirement of 80 acres.

Although the January 1, 1993, deadline has passed for the federal tax credit, it is not expected that the rate of development will slow significantly in Michigan. Approximately 900 new gas wells were approved during the first half of last year.

For more information: *Tom Edison, Center for Wildland Conservation, 517-785-2406* ◆

Get the Lead Out?

A new technology may radically alter the age-old polluter practice of pointing the finger at the other guy, according to researchers at the University of Michigan. Joseph R. Graney, a doctoral student in geology, and Gerald J. Keeler, an assistant professor of environmental and industrial health, have been testing a method of tracking the mix of lead isotopes in air pollution. By using these chemical "fingerprints," as they call them, distant air emissions can be traced to specific sources. Graney presented the pair's findings in early November to the Geological Society of America meeting in New Orleans. Their work could eventually simplify the task of monitoring air pollutants and enforcing air quality laws because each source has its own unique ratio of isotopes. For more information: *News and Information Services, University of Michigan, 313-747-1848* ◆

Managing Riparian Open Space

By David Sherrard

The city of Bellevue, Washington, has more than 20 years of experience in preserving open space. It has focused on stream resources, wetlands, and steep and hazardous slopes in order to protect water quality, preserve slope stability, control erosion and sedimentation, and preserve related benefits such as fish and wildlife habitat. Experience, however, has shown that preservation alone is not sufficient. Management is an ongoing challenge that requires the commitment of resources and expertise and continuing public support.

The amount of open space preserved in Bellevue increased significantly in 1987, when the city adopted an extensive set of land-use code changes designed to protect sensitive natural features. This has also involved the city in preserving open space retained in private ownership.

The examples in this article come largely from a recently urbanized portion of Bellevue within the Coal Creek and Lewis Creek watersheds. Bordering on its southern end the 2,000-acre King County Cougar Mountain Regional Wildlands Park, this area is among the most topographically varied in the city. Since the early 1970s, it has been transformed from second-growth forest lands to predominantly single-family development. In the process, the city has placed approximately 500 acres of stream corridors, wetlands, and steep slopes in open space designations.

Ecological Issues

Many of the issues faced in open space preservation stem from the retention of only a small part of a larger natural system and attempting to preserve natural functions in a largely human setting. The city has developed a classification system that rates streams according to a number of factors including water conveyance, water quality, adjacent vegetation communities, fisheries resources, wildlife habitat, and aesthetics. Stream corridor widths range from 50 to 100 feet (25 to 50 feet on each side). These corridors obviously include only a small part of the natural drainage basin.

Replacing most of the watershed with development presents such basic problems as maintaining water flows in streams. Bellevue's storm system relies on using natural stream channels for conveyance wherever possible. Storm detention systems are required to hold the higher runoff volumes from impervious surfaces such as streets, parking lots, and roofs with a metered discharge into streams. This preserves the flows downstream of the discharge point, but can intercept flows and dry up stream headwaters. Our strategy for preserving headwaters flows includes preserving headwater channels and groundwater interflows by diverting groundwater intercepted by road cuts and building foundation drains back into streams rather than into the stormwater system.

The quality of vegetation communities is also a major issue. Although second-growth forests in the Pacific Northwest appear quite dense in their native state, the spacing of mature trees tends to be fairly wide. This may provide only one or two trees for a given 50-foot stream corridor cross-section, with few benefits of cover for wildlife or shading for temperature control in streams.

The successional characteristics of these forests is an additional problem. They have been logged periodically since the 1870s. The initial colonizer in the regeneration cycle is generally red alder, whose life span is 30 to 60 years. Much of the open space we are preserving is characterized by mature alder, which is potentially hazardous to buildings being constructed nearby. Both alder and more permanent climax evergreens such as fir and hemlock tend to be subject to windthrow when the uniform forest canopy is removed and individual trees are exposed to an unaccustomed wind load. This combination of low tree density and windthrow sometimes results in corridors with only a few spindly trees. The transition from the existing dense canopy to an environment with ample sunlight favors intrusive weed species like blackberry, which tends to choke out native trees and understory. Removal of the surrounding forest also limits seed sources for the complex community of plants characterized by mature forests.

Bellevue's response to these problems has been to impose two requirements on new developments: to survey and remove hazardous trees, and to replant open space areas with native evergreen trees and understory that will establish a natural succession and eventually shade out and replace invasive species.

Management Issues

Even with initial steps like these, preserved open space corridors have ongoing management needs such as control of invasive species, removal of hazard trees, control of trash and debris disposal, and dealing with unauthorized tree removal and pruning. Even though the public generally supports the preservation of natural amenities, new residents do not always perceive a few scattered trees along a stream corridor as an aesthetic bonus. The fear of adjacent landowners that the remaining trees may fall on their houses adds anxiety. Where topography and clearing have provided panoramic views, the prospect of trees growing up and blocking those views can erode support.

Effective management requires a reaffirmation of the values of water quality, slope stability, erosion control, and the fish and wildlife habitat for which they were preserved as well as a public consensus that open space is an important part of the community.

In the 1970s, most open space areas in the city were dedicated as parkland. The cost of managing these narrow strips of land along streams and steep slopes led to

Retaining and replanting native vegetation, as in this subdivision, is at the core of the site planning that implements Bellevue's approach to the preservation of riparian corridors.

a change in parks department policy to avoid additional acquisitions unless they have significant value for the community as a whole in providing recreation opportunities. At the same time, the city was experiencing problems with trespass from adjacent owners for either the removal or pruning of trees to maintain views or the disposal of trash, leaves, and grass clippings. The issue of tree clearing was addressed by: assessing stringent civil penalties including triple damages for trees removed or pruned; having the parks department prepare forest management plans based on a policy of maintaining stands of healthy native vegetation; and developing a system of trails through the corridors, where appropriate. Preparation of management plans directly involved advisory committees from the local neighborhood and provided an educational orientation in resource issues for interested citizens. Volunteers were enlisted in implementing enhancement activities such as cleaning up debris or planting new trees. The development of the plans and trail systems has contributed to a shift in perception of these open space areas from being primarily an amenity (or inconvenience) for adjacent lot owners to a public resource with value for the community as a whole. Residents have consistently rated trails as one of the city's most popular recreational resources.

In new development, the initial open space management question is ownership. Where city ownership is not viable, the options for private ownership generally are placement in separate parcels or restrictions over individual lots. For marketing reasons, developers often prefer restrictions on portions of lots to require owners to preserve native vegetation. A 20,000-square-foot lot divided evenly between preserved and usable area generally sells for more than a 10,000-square-foot lot adjacent to an open space tract.

Property owners cite a number of factors in not observing these restrictions, including lack of clear communication of the condition at the time of sale, lack of clear boundaries, lack of clear definition of what activities are and are not allowed, and cultural values that generally validate wide property owner discretion in managing private property. The main problem with city enforcement is lack of knowledge of violations. Most information comes from complaining neighbors who are often motivated by interests other than concern with the resource. Assessing penalties for violation of conditions is procedurally more time consuming than enforcing trespass violations on public lands. The major advantage of placing restrictions on individual lots is the ease of identifying the landowner as the party responsible for compliance.

Placement of open space in tracts owned in common by homeowners has several advantages. The land is generally not perceived by adjacent property owners as an extension of their private property. It generally receives oversight from at least some other members of the community. The major problems arise from a lack of clear responsibility for management. In many ways, this reflects the "problem of the commons" identified by Garrett Hardin and others. Because the land belongs to everyone and no one, there are no clear limits on individual use and no clear definition of individual or corporate responsibility. The designation of a homeowners association for management responsibilities initially provides such a mechanism, at least on paper. But most associations tend to atrophy over time unless they are large and manage facilities that provide a community focus and require regular decision making and monetary assessments. Even active associations face considerable procedural and legal obstacles in enforcing restrictions since they tend to be limited to expensive and time-consuming court action. Often, the city is asked to take enforcement action against adjacent homeowners for tree cutting or deposition of debris on open space lands. In most cases, the city is obliged to address enforcement actions against the association itself as the owner of the open space.

Bellevue's policy is to encourage public ownership of larger or more extensive stream corridors, to prefer common ownership and homeowners association management over placing restrictions on individual lots, and to ensure that management plans and vegetation enhancement for a viable long-term plant community are implemented at the time of development. This ensures that resource values are maintained during their transition from a natural context and provides a starting point for a viable, low-maintenance open space area.

Community support is enhanced by education as well as by opportunities to interact with the resource. Interpretive facilities or recreational trail systems that are compatible with the resources bring the public into open space areas to enjoy and appreciate them as part of the fabric of the community.

David Sherrard

David Sherrard is a senior planner for the Bellevue, Washington, Department of Community Development. He is responsible for coordinating application of the city codes for environmentally sensitive areas and recently completed the first update in sensitive area codes since their initial adoption in 1987.

An Interview with: Hank Dittmar

By Jim Schwab

Next year, Congress will consider reauthorization of the Intermodal Surface Transportation Efficiency Act (ISTEA). Hank Dittmar is executive director of the Surface Transportation Policy Project (STPP), a public interest coalition formed to advance public debate on national transportation policy. APA is a member of STPP.

Suppose we grade the states and metropolitan planning organizations (MPOs) on their efforts in implementing ISTEA. Who gets the high marks?

The MPOs and states that have succeeded with ISTEA were already engaged in thinking intermodally before the law passed. They were able to move quickly to use the law as an opportunity. By and large, those were states on the East and West coasts where they had reached the probable limits of highway expansion, and MPOs whose state law had given them the power to do something before ISTEA passed.

We are seeing a counter reaction from the states now, largely led by the rural West and the Plains states. They have pushed through the American Association of State Highway and Transportation Officials (AASHTO) a resolution to make ISTEA optional.

We're getting some intense reaction.

Has ISTEA made a substantial difference in emphasis within plans?

We've seen three-quarters of a billion dollars programmed for transportation enhancements—rail-trails, bicycle and pedestrian projects, historic preservation of transportation facilities, easements and scenic facilities. The amount actually spent is much less. We've seen $2.1 billion transferred and obligated (spent) on transit projects from the highway account as of the end of fiscal year '95. We've seen in the most recent Federal Highway Administration condition and performance report that bridge conditions are improving. But the states are still spending more money on new capacity than on maintenance, although the maintenance needs outstrip the new capacity needs. The pipeline is a large part of that. It takes seven years to deliver a major transportation project. All the ones that were three years into the process are just now getting built.

Change will take time. The MPOs weren't used to having power. Suburban officials from inner suburbs don't understand that they have a common agenda with central cities. Those power dynamics will take a while to emerge. The highway lobby is still the second-largest PAC contributor in national politics. And you have an integrated relationship between road contractors and state highway departments and legislatures that has been in place since the interstate system got created. You don't pass a law and have that go away. They still can exercise their rights within and around the limits of the campaign financing laws.

Two big innovations in ISTEA were transportation enhancements and the Congestion Management and Air Quality (CMAQ) program. Can you give us some good success stories here?

San Jose, California, has built a child care center at a station on the light rail line and the commuter rail line, which provides for the opportunity to make one trip to transit and child care at the same time. This reduces the air quality impacts and makes it more likely that families dealing with child care and working responsibilities can take transit.

Another notable example is the Fruitvale Transit Village, where the Spanish-Speaking Unity Council has signed an agreement with the Bay Area Rapid Transit District and is using ISTEA funds to reclaim the parking lot, which had long separated the transit station from the community. They are using that parking lot to provide a health clinic, housing, retail, and parking, and using the transit station as the core of the revitalization of the neighborhood.

A similar child care project is underway in Cleveland. Many transit systems have used the CMAQ money to divert their buses to clean-burning fuels. In Chicago, a community coalition fought the closing of the Green Line, succeeded in getting the CTA to rebuild it, and is moving forward on transit-oriented development strategies in and around it.

The lasting impact of ISTEA will be examples of new ways to invest, coupled with cancellations of old ways. Once local officials get used to having the opportunity to build these kinds of projects, they're going to discover that the public loves them, and the public and local officials are going to demand that states be accountable for this money.

What is the level of public understanding of the need for transit-oriented development and a more compact urban form?

We find that people are very positive, but they don't necessarily see these things related to how their transportation dollars are spent. At the same time, they see money going into road construction that never solves any of the problems. There's not a lot of faith in the transportation institutions because of this.

There's not yet an understanding of the solutions, although when we ask people what they thought the highest priorities for spending transportation dollars were, they said number one, fixing roads; number two, transit and rail; and tied for number three were sidewalks and bicycle facilities, and newer, wider roads.

Planners can try to develop local examples. I don't know any other way to get people to understand the regional context and the need for comprehensive planning. If we were able to have a thousand transit-oriented or pedestrian-oriented developments around this nation, we would be doing a lot better at comprehensive planning because people would understand the connections. And a lot of those changes are cheap. Diagonal parking is usually something a planning department and a traffic engineer can arm-wrestle over and get done within the context of a city public works budget. But it offers the opportunity to slow the traffic down. It offers the opportunity at the corner to bring the curb out a little bit. Think about how to use transportation money as infrastructure to write down development costs to mixed-use development. If you can line up your local ISTEA dollars so that they're paying for the sidewalk, and they're paying for the hard costs of a development that's going to bring housing back in toward

the center of the city, maybe you create a new affordability to get some market-oriented development in as well.

The final ISTEA rule requires six major systems plans in the metropolitan transportation plan. How do planners work out the relationship between these systems in the context of shared governmental responsibility?

The six management systems are one of the great unrealized potentials of ISTEA. The regulations did not help to make them comprehensive. They failed to clearly understand the relationship between some that were related to managing the physical assets of the transportation system and others related to managing its performance. They failed to set up a consistent system definition between the different management systems. They were prescriptive in terms of data while failing to link them into the planning process in any meaningful way. So the management systems have become data-gathering exercises for the pavement engineers and the traffic engineers, rather than becoming decision tools for the planners and the programmers. And the fact that they didn't designate consistent systems has meant that it's been difficult for people to rationalize them within metropolitan areas.

That said, there are a few successes. The MPO in Albany, New York, has done a superb job of implementing the management systems the way *they* saw them rather than the way the regulations saw them. A few states have done a good job with the bridge management system.

I would scrap the management systems and replace them with performance benchmarking. The planning process ought to be about strategic planning, and we need to begin to set goals and measurable objectives, and then set benchmarks for where we want to go with our investments and collect the data to determine whether we're moving forward. The whole planning process needs to evolve away from capital facility planning and transportation to system management planning.

The MPO and state transportation plans are good at setting goals and objectives for a socially just, multimodal, environmentally sustainable system. But the projects are still being generated by this process that asks suburbs and cities how many jobs and people they will have in the future. It sums all those desire lines for growth into a projection which is divided into the number of necessary lanes. We need to move toward a more business-oriented planning process that asks where we want to go, and then use management systems to measure progress toward those objectives.

What were the best hopes for ISTEA when it was passed, and how has that changed?

We've come to recognize that transportation reform is a long-term process. We didn't build the interstate system overnight, and we're not going to make it responsive to people in communities overnight. Passing the law only defines the opportunity, and it provides citizens and planners with access to this huge, engineering-dominated system. Access is useful only if you have organized desire to go in that direction, and so we have begun to devote our attention at STPP to organizing, to working with citizen groups to educate them to take advantage of that opportunity.

What are the prospects on reauthorization of ISTEA?

I think ISTEA anticipated the mood of this Congress. From our perspective, the transportation legislation that preceded ISTEA was federally driven, regulation-bound, and unresponsive to either fiscal constraint or the will of the people. ISTEA pushed decisions closer to communities by creating this regional opportunity for decision making. It said you had to plan and deliver projects within a budget, no more continuing cost overruns as we saw on the interstate system, and it said we need to give people at the local level the flexibility to use the money to meet local needs. That is, I think, wholly consistent with the direction of the new Congress.

Now, my friends at AASHTO will say the requirements to do planning or involve the public are needless and burdensome regulation, and we want to do that only at our option. But who says the state government is closest to the people? I haven't seen that. By and large, the American public says local government is the government they trust the most. We need to look at ISTEA as a partnership between local, state, and federal government. Local governments invest a lot of money in transportation, and it is their involvement that has been most threatening to state governments. The crunch comes when you understand that we're replacing a federally dominated, federally designed standard system with one that involves local accountability. And the oxes that are getting gored are the state DOTs and the construction community, which fears that if local government gets involved, there will be smaller contracts, less asphalt, and that the system will by and large be less easy to influence politically.

I think our prospects are good. The United States Senate invited us to submit language on making the National Highway System (NHS) more flexible. And they included in the NHS bill a provision that makes design standards flexible and responsive to community, environmental, and historic concerns. The Senate voted by a large majority to allow highway funds to be used for Amtrak. This message of flexibility and local involvement can resonate.

The planning community is going to have to talk about ISTEA plans and programs as budgetary control documents to ensure that projects are delivered within budget. Instead of wish lists used to justify tax increases, we're beginning to be more responsive about maintaining the system and getting performance out of it. Planners will have to talk in terms of performance, about local decision making and local control and about flexibility and choice. They're going to make the planning process one of partnership and openness rather than an impenetrable bureaucratic exercise.

Have we made enough progress? I think it's largely a question of talking about the success stories rather than whining about what might have been. MPOs and city and county officials have to understand that they need to be talking about the things they do. If they are complaining about what didn't happen, the blame is going to be laid at their door, and the alternative will not be that we're going to give them more power. The states will get all the power back.

Hank Dittmar, executive director of the Surface Transportation Policy Project, was manager of legislation and finance for the Metropolitan Transportation Commission in Oakland, California, at the time ISTEA was passed. Under his direction, STPP has initiated national debate on the economic, social, and environmental performance of the national transportation system and the desirability of major upgrades to the nation's highway system.

By Mark S. Dennison

CERCLA Enforcement

The U.S. EPA and the Department of Justice (DOJ) have issued a joint memorandum, dated September 22, 1995, entitled "Policy on CERCLA Enforcement Against Lenders and Government Entities That Acquire Property Involuntarily," which explains that the two agencies "intend to apply as guidance" the provisions of the EPA lender liability rule promulgated in April 1992. That rule was struck in 1994 when the U.S. Court of Appeals for the District of Columbia Circuit ruled that EPA lacked authority to issue the rule as a binding regulation. [See *Kelley v. EPA*, 15 F.3d 1100 (D.C. Cir. 1994), rehearing denied, 25 F.3d 1088 (D.C. Cir. 1994), cert. denied; *American Bankers Association v. Kelley*, 115 S.Ct. 900 (1995).] However, that decision did not preclude EPA and DOJ from following the rule's provisions as enforcement policy.

The memorandum states that, due to the "unintended" effects of CERCLA, government entities that acquire contaminated property involuntarily may be reluctant to undertake cleanup actions at these sites. CERCLA contains an exemption for government entities that acquire property involuntarily, but neither the legislative history of CERCLA, nor the case law, provide sufficient explanation of when a property acquisition or transfer is considered "involuntary." EPA did, however, address this issue in its 1992 rule and clarified when a government entity was exempted from CERCLA enforcement as an owner or operator of contaminated property.

Copies of this memorandum may be ordered from the National Technical Information Service (NTIS) by calling 703-487-4650. For orders via e-mail/Internet: orders@tis.fedworld.gov. The NTIS order number is PB95-234498.

Final Rule on Sludge

The EPA has issued amended final regulations concerning the use and disposal of sewage sludge. [See "Standards for the Use or Disposal of Sewage Sludge," 60 FR 54764 (Oct. 25, 1995).] The final rule is effective October 25, 1995. Previously, pursuant to Section 405 of the Clean Water Act (CWA), EPA promulgated regulations (40 CFR part 503) to protect public health and the environment from reasonably anticipated adverse effects of certain pollutants in sewage sludge (see 58 FR 9248, February 19, 1993). This regulation established requirements for the final use or disposal of sewage sludge when it is applied to the land either to condition the soil or to fertilize crops grown in the soil; placed on the land for final disposal; or incinerated.

The final rule amends the 40 CFR part 503 regulations as a result of EPA's reconsideration of certain issues remanded by the U.S. Court of Appeals for additional justification or modification. [See *Leather Industries of America v. EPA*, 40 F.3d 392 (D.C. Cir. 1994).] The court held that the EPA's use of the 99th percentile concentration levels of chromium and selenium found in sludge to establish pollutant limits for land application violated the CWA because these levels were more stringent than risk-based levels. The agency is deleting the current land application pollutant limits for chromium and changing the land application pollutant concentration limit for selenium.

In addition, EPA previously amended the General Pretreatment Regulations (40 CFR part 403) to establish a list of pollutants for which a removal credit may be available. The new final rule amends the list of pollutants for which a removal credit may be available. It removes chromium in sewage sludge that is land-applied from the list of regulated pollutants for which a removal credit may be available and adds it to the list of unregulated pollutants that are eligible for a removal credit.

Waste Scheme Passes

In one of the first cases to be decided after the U.S. Supreme Court's important *Carbone* decision [114 S.Ct. 1677 (1994)], the U.S. Court of Appeals for the Second Circuit has upheld a local ordinance regulating the collection and disposal of solid wastes within a designated commercial garbage collection district (see "Controlling the Flow of Municipal Solid Waste," July 1994). The court held that the ordinance—which prohibited local businesses within the district from hiring their own garbage haulers, required the businesses to use the services of a single garbage hauler hired by the town, and permitted the hauler to dump the garbage collected from the district free of charge at an incinerator owned by the town—was not an impermissible restraint on interstate commerce.

The court distinguished the challenged ordinance from the one struck down by the U.S. Supreme Court in *Carbone*, finding that the town was not favoring local garbage service companies over out-of-state competitors. Instead, it had chosen to exclude all garbage service companies from the market, both local and out-of-state, by itself becoming the sole provider of garbage services to businesses within the commercial garbage collection district. Thus, the town was merely carrying out the traditional local governmental function of providing municipal sanitation services to local businesses. [*USA Recycling, Inc. v. Town of Babylon*, 1995 WL 553843, 64 U.S.L.W. 2186 (2d Cir., Sept. 19, 1995).]

More on Brownfields

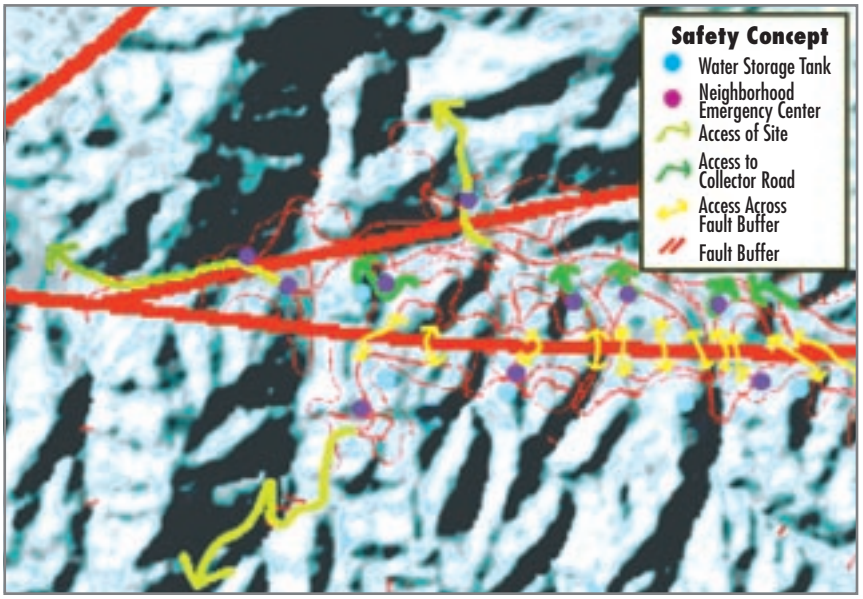
EPA is funding 50 two-year demonstration pilots for cleaning up and redeveloping brownfield sites, defined as abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived risks from environmental contamination. EPA's Brownfields Initiative is an organized commitment to help communities clean up and restore economic vitality to areas where these sites exist.

On November 9, 1995, EPA issued a press release announcing selection of 11 more Brownfields Economic Redevelopment Pilots. Eight communities and three states were chosen to receive up to $200,000 each over the next two years to fund these projects. The program has funded 29 projects since November 1993. EPA expects to select 21 more by the end of 1996. On September 22, 1995, the EPA announced deadlines and new application criteria for submission of proposals. [60 Fed. Reg. 49276 (Sept. 22, 1995).] In order to be considered in the next round of competition, applicants must have their proposals postmarked or sent to the EPA via registered or tracked mail by March 4.

To improve further the competition process, EPA has made clarifications to the Application Guidelines for Demonstration Pilots (revised edition September 1995). Application booklets can be obtained by calling the Superfund Hotline at 800-424-9346, or by writing to: U.S. EPA—Brownfields Application, Superfund Document Center 5201G, 401 M St., SW, Washington, DC 20460.

Building Disaster-Resistant Communities

By Ken Topping and Mark Sorensen



Mark Sorensen

A digital graphics file showing eathquake safety features.

Natural hazards are part of our global environment. Disasters are created by the combination of natural hazards and urban development that is insufficiently mitigated to minimize risk of loss of life and property.

In recent decades, natural hazards have made themselves more visible as in the January 17, 1995, earthquake that killed nearly 6,000 people in Kobe, Japan, and destroyed or damaged about 100,000 buildings.

Perhaps the most important lesson is that areas thought safe from major earthquakes can unexpectedly experience them. Another useful lesson from Kobe was the importance of modern structural standards—less than three percent of the buildings constructed to the most recent codes were damaged. Also significant were pre-existing problems—excessively narrow streets, inadequate water supply for fire fighting, and high development densities along a fault zone.

Disaster-Resistant Sustainable Development

The idea of sustainable development has grown to include natural hazard mitigation. Experience from natural disasters has introduced new safety measures into city planning involving layout of streets, parks, water systems, and other community features.

Common disaster-resistant design measures include setbacks from fault and flood hazard zones, density limitation or transfer, provision of adequate street widths and water supply, assurance of secondary emergency access, and strategic provision of open space for fire breaks and equipment staging.

Creating Safer Communities and Speeding Recovery

Geographic information systems are now being deployed to help design safer communities, linking planning with emergency management. Common applications include data compilation and analysis, risk assessment, hazard mitigation, contingency planning, emergency response, damage assessment, recovery, and reconstruction.

Disaster-resistant community design involves certain processes for which GIS is particularly useful. Essential steps include: (1) identifying natural hazards in the community and on project sites; (2) evaluating vulnerability from hazard impacts on prospective development; and (3) applying hazard mitigation design solutions tailored to the particular situation.

GIS was used in a new town plan formulated by a design team led by the Environmental Systems Research Institute of Redlands, California, for a site in northern Kobe where a major homebuilder is planning to construct post-earthquake replacement housing. Emphasizing energy-efficient and disaster-resistant design principles, the plan utilized GIS to analyze relationships between such factors as geology, soils, hydrography, slope, climate, and various design options.

In the plan, multiple road crossings are provided over two fault zones in the event certain roads are blocked by fault surface rupture. Likewise, multiple routes are provided to and from the community in case some access point is blocked. Buildings are set back from the fault zones, landslide zones, and areas with soft soils, and building arrangements are harmonious with hilly terrain, avoiding mass grading that could create serious landslide problems. Water storage is distributed strategically in case of fire, and emergency supplies are identified at accessible locations.

GIS has been useful in speeding recovery and reconstruction. After the Oakland Hills and Laguna fires in California, as well as the Northridge earthquake, GIS was used by the Federal Emergency Management Agency, the California Governor's Office of Emergency Services, and local governments to plot damage patterns, relate them to hazard conditions, and monitor the location and timing of permit issuances.

Investments in Safer Living

In the long run, it is far less costly to design development with proper attention to hazard mitigation. Losses of human life and property and inordinate costs of reconstruction are minimized if development and redevelopment follows disaster-resistant design principles.

Rather than deny the presence of commonly found hazards, the disaster-resistant community design approach openly recognizes known risk factors and the attendant costs of mitigation. This new approach treats hazard mitigation costs in the development process as a wise investment, the return for which is safer and less disrupted living, reduced property losses, and faster, less expensive recovery when disaster strikes.

Using GIS to facilitate disaster-resistant community design is a relatively modest short-term investment bringing multiple benefits that far outweigh the costs. If properly designed and implemented, GIS can pay for itself quickly and many times over. A nationwide econometric study published in 1994 by the National Research Council reported tenfold and greater returns within a few years among many private-sector service firms as a result of information technology applications.

Ken Topping, AICP, is a principal of Topping Jacquess Consultants, a planning firm in Pasadena and San Bernardino, California. Mark Sorensen is president of the Geographic Planning Collaborative, Inc.

In economic theory, one of the key factors contributing to market failure is imperfect information. The impact of this is particularly harsh in rural areas. In *Rural Development in the United States: Connecting Theory, Practice, and Possibilities* (Washington, D.C.: Island Press; 362 pp.; $32), William A. Galston, deputy assistant to the President for domestic policy, and Karen J. Baehler, a graduate student at the University of Maryland, analyze the state of rural America within the context of national and international policy trends over the last two decades. They emphasize three key developments: the decreasing importance of raw materials in industrial production, the increasing productivity of manufacturing and the resultant decrease in need for blue-collar workers, and the lack of capital investment in innovation and people.

The authors develop an intellectual framework based on economic, social, and political theory, interweaving theories on development, politics, and quality of life and relating them to the situation facing rural America today. They then tackle seven key sectors of the rural economy: natural resources, manufacturing, service, tourism, the elderly, high technology, and telecommunications. They suggest specific economic development strategies and analyze the impact of development efforts on quality of life. If rural communities are to stem the outflow of young adults, they must remain attractive places to live. Employment opportunities are just one part of the complex formula.

During the 1980s, much of rural America shifted from a raw materials/manufacturing economy to a service/leisure economy. While this trend has allowed many communities to survive change, the authors advocate striking a balance between the traditional sectors and new, consumer-oriented sectors like recreation and tourism. They emphasize flexibility, innovation, and diversity as means to create a cushion against changes in national and international policies.

Megan Lewis

Adapting to change is also the theme of *At Road's End: Transportation and Land Use Choices for Communities* (Washington, D.C.: Island Press; 176 pp.; $37.50). The authors—Daniel Carlson, Lisa Wormser, and Cy Ulberg—are all affiliated in various ways with the Surface Transportation Policy Project (see "Planning Trends"), which sponsored this publication. It is thus not surprising that their goal is to empower citizen groups and progressive public officials to seize the opportunities presented by the Intermodal Surface Transportation Efficiency Act by pursuing creative alternatives to more and bigger highways. In doing so, they present a series of excellent, well-written case studies that involve communities developing more holistic approaches to planning regional transportation systems. In addition, however, the book can serve as a useful source of information for planners involved in implementing ISTEA requirements.

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